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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>D03D 1/02, B60R 21/16</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 96/27702</b> <b>(43) International Publication Date:</b> 12 September 1996 (12.09.96)
<b>(21) International Application Number:</b> PCT/SE96/00267 <b>(22) International Filing Date:</b> 1 March 1996 (01.03.96) <b>(30) Priority Data:</b> 9500771-2                      3 March 1995 (03.03.95)                      SE <b>(71) Applicant (for all designated States except US):</b> FOV FABRICS AB [SE/SE]; P.O. Box 165, S-501 04 Borås (SE). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> JOHANSSON, Mats [SE/SE]; Första Villegatan 14, S-502 44 Borås (SE). LÖNGÅRDH, Gunnar [SE/SE]; Grudegatan 10, S-502 45 Borås (SE). <b>(74) Agent:</b> AWAPATENT AB; P.O. Box 11394, S-404 28 Göteborg (SE).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>
<b>(54) Title:</b> USE OF CLOTH OF HIGH TENSILE AND TEARING STRENGTH FOR AIRBAGS  <b>(57) Abstract</b>  The invention relates to the use of a cloth possessing high tensile and tearing strength. It consists of a fabric comprising multifibre yarns of approximately equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same. The cloth uncoated or combined with a polymer film is intended to be used as the material for impact-protective, inflatable air bags for vehicles.		

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Use of cloth of high tensile and tearing strength  
for airbags.

The subject invention relates to the use of a cloth possessing high tensile and tearing strength. More precisely, the invention relates to a cloth of the kind consisting of a fabric comprising yarns of approximately  
5 equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same. Said binding pattern is arranged in such a manner that the weave repeat comprises six warp yarns and six weft yarns and  
10 according to which pattern the first and the fourth weft yarns pass above the first, the second, the fourth, and the fifth warp yarns, the second weft yarn passes above the first, the third, and the sixth warp yarns, the third weft yarn passes above the second, the third, and the  
15 sixth warp yarns, the fifth weft yarn passes above the third, the fourth, and the sixth warp yarns, and the sixth weft yarn passes above the third, the fifth, and the sixth warp yarns.

Cloths of this kind have been used for some years as  
20 a technical textile fabric to be used for various purposes, such as for tarpaulins, covers and for other applications. A great advantage inherent with this type of cloth is that its particular binding pattern gives the cloth a considerable tensile strength as well as tearing  
25 strength in the warp as well as in the weft directions. In addition, the binding pattern provides a high degree of balance not only of the tensile strength in the warp and weft directions but also of the tearing strength in both directions, which is not the case in conventional  
30 simple two-shaft fabrics with symmetrical setting.

It has now been found that the above cloth lends itself excellently well for use as the material of inflatable air bags, such as e.g. air bags used in

vehicles. The requirements that the material for such bags must meet are extremely high. When folded and compacted, air bags form packages of a comparatively reduced size since the available volume always is small.

- 5 In the event of release induced by a vehicle collision, the air bag should be inflated within only approximately 40 msec in order to rapidly provide satisfactory impact protection.

Owing to its high strength qualities, the cloth described above has proved to function extremely well in the applications referred to. In addition, the cloth is more flexible and more adaptable than fabrics hitherto used for the manufacture of air bags. This feature is of uttermost importance when the air bag is to be folded and packaged in a module housing. The space available to the air bag in a module housing is very restricted. In this respect, the high tearing strength of the cloth could likewise be of life-saving importance. Also its tensile qualities are favourable in this connection.

- 20 In order to illustrate the merits of the cloth in more practical terms, a specification is given below of the strength relationships in a conventional two-shaft weave compared with those in a weave in accordance with the invention. The weave has a yarn diameter of 470 dtex and a yarn density of 20 x 20 yarns/cm.

	<u>Tensile strength (N/5cm)</u>		
30	2-shaft weave	}	= 3000
	Weave of invention		

Tearing strength (in N)

5

Uncoated weave

Silicone coated weave

Two-shaft weave (1/1 binding):

warp & weft directions = 120 = 220

Weave of Invention:

10 warp & weft directions = 170 = 400

15 The higher tearing strength of the weave in accordance with the invention thus provides opportunities for the manufacture of air bags meeting very high demands on strength and durability.

## CLAIMS

1. The use of a cloth possessing high tensile and tearing strength and consisting of a fabric comprising yarns of approximately equal coarseness which are interwoven in a special binding pattern with the yarn density in the warp and in the weft being approximately the same, the weave repeat of said binding pattern comprising six warp yarns and six weft yarns and according to which pattern the first and the fourth weft yarns pass above the first, the second, the fourth, and the fifth warp yarns, the second weft yarn passes above the first, the third, and the sixth warp yarns, the third weft yarn passes above the second, the third, and the sixth warp yarns, the fifth weft yarn passes above the third, the fourth, and the sixth warp yarns, and the sixth weft yarn passes above the third, the fifth, and the sixth warp yarns, c h a r a c t e r i z e d in that the cloth, uncoated or combined with a polymer film, preferably a silicone film, is used as the material for impact-protective, inflatable air bags for vehicles.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00267

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: D03D 1/02, B60R 21/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: D03D, B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT, CLAIMS, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0018335 A1 (ALMEDAHL AB), 29 October 1980 (29.10.80), figures 2,3, abstract --	1
Y	US 5277230 A (J.A. SOLLARS, JR.), 11 January 1994 (11.01.94), figures 1-5, abstract --	1
Y	Orbit Search Service, File WPAT, Accession number 95-138903/18, WACKER SILICONES CORP. ET AL, CA2122071-A 95.02.27 (9522) --	1
Y	Orbit Search Service, File WPAT, Accession number 93-236653/30, SHINETSU CHEM CO LTD ET AL, JP05202338-A, 93.08.10 (9336) --	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

01/04/96

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 0018335	29/10/80	AT-T- 3157 SE-B,C- 421016 SE-A- 7902880	15/05/83 16/11/81 03/10/80
US-A- 5277230	11/01/94	CA-A- 2114684 EP-A,A- 0612644 JP-A- 6298028	23/08/94 31/08/94 25/10/94